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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/581,578

12/26/2006

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EXAMINER

WALCK, BRIAN D

ART UNIT

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4181

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/581,578	<b>Applicant(s)</b> HAYASHI ET AL.	
	<b>Examiner</b> Brian Walck	<b>Art Unit</b> 4181	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 December 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 30-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 30-49 is/are rejected.
- 7) ☒ Claim(s) 48 and 49 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____.                                     |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/02/2006, 12/26/2006, 2/25/2008, 5/06/2008,</u>              | 6) <input type="checkbox"/> Other: _____.                         |
| <u>6/03/2008.</u>  |   |



## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed 5/06/2008 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the article by Riei Yokoyama et al titled "Adsorption of Fluorine and Nitrate Ions by Charcoal" was provided without a publication date or source, both in the IDS and the file attached. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

2. The information disclosure statement filed 12/26/2006 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the Japanese patents 52-34260, 52-16363, and 48-93591 do not have an English translation or an English abstract. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

***Specification***

3. The disclosure is objected to because of the following informalities: the specification repeatedly references specific claim numbers. Numbered claims should not appear in the specification.

Appropriate correction is required.

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Objections***

5. **Claims 48 and 49 are objected to** under 37 CFR 1.75 as being a substantial duplicate of claims 40 and 38, respectively. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

***New Matter***

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7. **Claim 37 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation "the carbonized raw plant material and calcium ions are cooled to an ambient temperature before applying an acid solution" is new matter that is not present neither in the specification nor the previously cancelled claims.

#### **Scope of Enablement**

8. **Claims 32, 42, 45-47 are rejected under 35 U.S.C. 112, first paragraph,** as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims because the specification, while being enabling for producing an anion adsorbing carbon material, **does not reasonably provide enablement for** producing an anion adsorbing carbon material wherein the carbonizing of the raw plant material is performed **without any activation** of the carbon for increasing a physical adsorption effective area as claimed.

Attention is directed to *In re Wands*, 8 USPQ 1400 (CAFC 1988) at 1404 (CAFC 1988) at 1404 where the court set forth the eight factors to consider when assessing if a disclosure would have required undue experimentation. Citing *Ex parte Forman*, 230 USPQ 546 (BdApl) at 547 the court recited eight factors:

- 1) *The nature of the invention:*

The instant invention is drawn to a method of producing an anion adsorbing carbon material wherein a raw plant material is brought into contact with a solution containing calcium ions, the raw plant material is carbonized, and the carbonized material is contacted with an acid solution. Furthermore, applicant discloses examples of the calcium solution as calcium chloride, calcium acetate, or calcium hydroxide (referred to as applicant as milk of lime water). Claims 32, 42, 45-47 recite that the material resulting from carbonizing the calcium chloride and plant material is non-activated.

2) *The state of the prior art:*

The state of the art recognizes that a carbon material treated with calcium chloride, calcium acetate, or calcium hydroxide will be activated upon carbonization.

For example: US 2,003,278 discloses that activated carbon is produced by treating carbon material with calcium acetate. US 3,168,485 discloses that activated carbon can be prepared by the carbonization of carbonaceous materials impregnated with calcium hydroxide or calcium chloride; US 3,835,064 discloses that activated carbon can be prepared by carbonization of carbonaceous materials impregnated with calcium hydroxide or calcium chloride; US 4,937,223 discloses that ligneous material can be activated by carbonization in the presence of calcium chloride or

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calcium hydroxide; US 5,614,459 discloses that activated carbon can be prepared by the carbonization of carbon material in the presence of calcium chloride; CN 1040185 A discloses that activated carbon can be produce by carbonizing a carbon-containing material in the presence  $\text{CaCl}_2$ .

The prior art discloses that the carbonization can be done in a variety of different atmospheres and temperatures and activated carbon will still result if an activating agent (i.e. calcium acetate, calcium chloride, or calcium hydroxide) is present with the carbon-containing material during carbonization.

3) *The relative skill of those in the art:*

The relative skill of those in the art is presumed to be extremely high and extremely credible as US patents have been issued on the subject for over 75 years.

4) *The predictability of the art:*

The prior art suggests that activated carbon can be very consistently and predictably achieved by treating a carbon-containing material with a chemical activating agent (i.e. calcium acetate, calcium chloride, or calcium hydroxide) prior to carbonization.

5) *The breadth of the claims:*

Applicant's assertion that the process claimed would be able to produce non-activated carbon does not commensurate with the



scope of the objective enablement, especially in view of the limited working examples.

6) *The amount of guidance/working examples:*

The specification contains no guidance as to how to carry out carbonization of a carbon-containing previously treated with an activating agent (i.e. calcium acetate, calcium chloride, or calcium hydroxide) without any activation of the carbon. The only reference to the notion that the carbonization of the material will occur without activation is in reference to figures 1, 2, 3, 4. Applicant states that figures 1-4 show a carbonization furnace that can carbonize a ligneous material without activation, and also states that metal chloride impregnated carbon chips are fed to that furnace to be carbonized by activation. Applicant does not disclose or imply how said furnace is capable of achieving this. Applicant states that the carbonization is conducted at a temperature between 650°C and 750°C, which is a temperature which causes activation in the prior art.

7) *Quantization of undue experimentation.*

The prior art states that activation will occur when a carbonaceous material is impregnated with calcium chloride, calcium hydroxide, or calcium acetate then subjected to carbonization. These are the only specific sources of calcium ions that applicant discloses in the specification.

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One of ordinary skill in the art would be burdened with undue "painstaking experimentation study" to determine how to carbonize a carbon material impregnated with calcium hydroxide, calcium acetate, or calcium chloride without obtaining activated carbon. Alternatively, one of ordinary skill in the art would be burdened with undue "painstaking experimentation study" to determine which calcium containing solutions carbon-containing materials can be treated with prior to carbonization which would not result in obtaining activated carbon.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 10. Claims 30-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The claim(s) are replete with indefinite and functional or operational language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. Examples of indefiniteness issues follow.

Claims 30, 45 recite the limitation "applying an acid solution to the carbonized plant material to combine anions with predetermined anions of a type that can be exchanged with anions that are the object of adsorption of the anion adsorbing carbon material." The limitation is indefinite because applicant does

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not disclose what said "predetermined anions" are or what "anions that are the object of adsorption of the anion adsorbing carbon material" are. Claims 31-38, 40-44, 46-49 are dependent on claims 30 and 45 and therefore suffer the same indefiniteness issue.

Claim 39 is indefinite because it is written in the form of a dependent claim ("further comprising") but recites no dependency on any claim.

Claim 36 recites the limitation "where the solution includes a liquid acid solution and the raw plant material is immersed in the liquid acid solution within a pressure range of 1330 Pa to 13.1 Pa." It is unclear whether "the solution" of claim 36 is the solution including calcium ions of claim 30 or the acid solution that is applied to the carbonized material of claim 30. Additionally, the specification recites that the carbonized material is treated in an acid solution within a pressure range of 1330 Pa to 13.3 Pa, not the claimed range of 1330 Pa to 13.1 Pa.

Claim 37 recites the limitation "the carbonized raw plant material and calcium ions are cooled to an ambient temperature." This limitation is indefinite because it does not state what said ambient temperature is.

Claims 40 and 48 recite the limitation "The manufacturing method for an anion adsorbing carbon material of Claim 30 is neutralized after the applying of an acid solution." This limitation is indefinite because it does not state what is neutralized.

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**12. Claims 30, 31, 38, 49 are rejected under 35 U.S.C. 102(b) as anticipated by US 4,937,223 to Yamaguchi et al (hereinafter referred to as Yamaguchi).**

Regarding claim 30, Yamaguchi discloses a process for preparing activated carbon (e.g. an anion adsorbing carbon material) wherein an aqueous solution of an alkali is brought into contact with lignin (which is plant material), the solution is stirred and heated to distill water off and the alkali-impregnated solution is then carbonized (Yamaguchi, column 2, lines 47-56). Furthermore, Yamaguchi discloses that the carbonized product is washed with dilute acid (Yamaguchi, column 3, lines 8-9). Furthermore Yamaguchi discloses that the alkali can be a hydroxide or carbonate of calcium (Yamaguchi, column 2, lines 33-36), and specifically discloses using calcium oxide or calcium sulfate (Yamaguchi, column 4, lines 14-16). Yamaguchi anticipates claim 30 because it discloses all of the limitations of claim 30.

Regarding claim 31, Yamaguchi discloses that before carbonization, the mixture is heated to distill water off (Yamaguchi, column 2, lines 49-50), i.e. the solution is dried.

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Regarding claim 38 and 49, Yamaguchi discloses using lignin as the raw plant material, and lignin is a ligneous material.

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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**16. Claims 33-37, 40-41, 43, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,937,223 to Yamaguchi et al (hereinafter referred to as Yamaguchi) as applied to claims 30, 31, 38, 49 above.**

Regarding claim 33, Yamaguchi discloses that the carbonization is performed at a temperature of from 250°C to 900°C, preferably from 400 °C to 650 °C (Yamaguchi, column 2, lines 57-58). In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists (see MPEP 2144.05 [R-5]).

Regarding claims 34-35, although Yamaguchi does not disclose what type of acid is used or its molar concentration, it would be obvious to one of ordinary skill in the art at the time the invention was made to use either HCl or H<sub>2</sub>SO<sub>4</sub> in a concentration range within 0.01 mol/L to 20 mol/L because HCl and H<sub>2</sub>SO<sub>4</sub> are among the most common acids used in chemical processes and a "dilute acid" as described by Yamaguchi would likely fall in the range within 0.01 mol/L to 20 mol/L.

Regarding claim 36, although Yamaguchi does not disclose the pressure at which the acid treatment occurs, one of ordinary skill in the art would be able to vary the pressure and determine the optimal pressure for the process via routine experimentation. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

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Regarding claim 37, Yamaguchi discloses that after carbonization, the carbonized lignin is left to cool (Yamaguchi, column 3, lines 3-5). Presumably the carbonized product is cooled to an ambient temperature.

Regarding claim 39, Yamaguchi discloses that after heat treatment (i.e. drying) the anion adsorbing carbon material is pulverized (i.e. formed into small grains and/or pellets) and then acid washed. Although the order of the steps is different than that of instant claim 39, it is prima facie obvious to rearrange the steps of a prior art process. See *Ex parte Rubin*, 128 USPQ 440 (Bd. App. 1959).

Regarding claim 40 and 48, it is unclear what claim 40 is claiming is neutralized, but it would be obvious to one of ordinary skill in the art at the time the invention was made to neutralize the used acid solution because in many processes acid solution is commonly neutralized after being used to minimize hazardous waste of the process.

Regarding claim 41, Yamaguchi discloses that the mixture of the lignin and aqueous solution is thoroughly stirred (Yamaguchi, column 2, lines 49-50), i.e. agitated, and that an aqueous solution of calcium hydroxide can be used (Yamaguchi, column 2, lines 33-36), which is what milk of lime water is. Furthermore, Yamaguchi discloses that the alkali is used usually from 0.1 to 10 parts by weight relative to one part by weight of lignin (Yamaguchi, column 2, lines 41-43). Although Yamaguchi does not disclose what weight percent of alkali the solution should be, it would be obvious to one of ordinary skill in the art

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to use an alkali solution of 5% by weight or greater of calcium ions so that the alkali is 0.1 to 10 parts by weight relative to one part by weight of lignin.

Regarding claim 43, it is expected that the carbon material product would be able to adsorb nitrates and fluorides.

**17. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,937,223 to Yamaguchi et al (hereinafter referred to as Yamaguchi) as applied to claims 30, 31, 38, 49, and further in view of US 3,168,485 to Knobloch et al (hereinafter referred to as Knobloch).**

Yamaguchi describes a process of preparing an anion adsorbing carbon material as described above. Yamaguchi fails to explicitly disclose that anion adsorbing carbon material is treated with a solution of NaCl or KCl.

Knobloch discloses that calcium chloride or sodium chloride can be added after pyrolytic treatment of a carbonaceous material for the preparation of activated carbon to improve the absorptive capacity of the carbon (Knobloch, column 1, lines 61-71).

Regarding claim 44, it would be obvious to one of ordinary skill in the art at the time the invention was made to take the anion adsorbing carbon material made by the process of Yamaguchi and expose it to NaCl or KCl as taught by Knobloch. The motivation for doing so would be to improve the absorptive capacity of the carbon.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Walck whose telephone number is



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(571)270-5905. The examiner can normally be reached on Monday-Thursday 8 AM-6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian Walck/

Examiner, Art Unit 4181

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4181